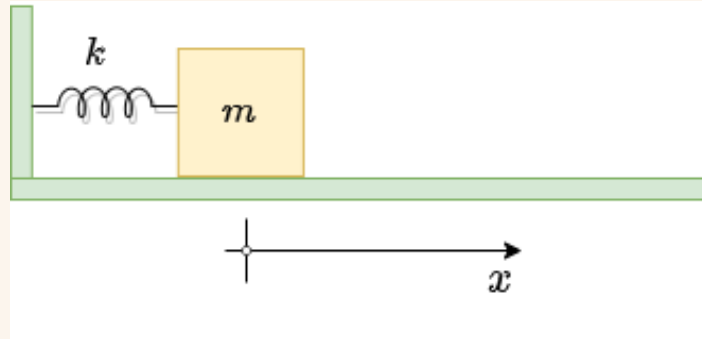# Practice setting up numerical solutions to Newton's Laws

Simple Harmonic Oscillator

For the system shown, the system can be described by the position and velocity (x and $v = \dot{x}$). The acceleration of the system is, of course, $a = \ddot{x}$.

a) Write down Newton's second law:

b) Separate into two first order equations:

c) Now replace dt, dv, dx with Δt, Δv, Δx and solve each of the above two equations for Δx and Δv.

d) Write down the Euler method solution and the Euler-Cromer method solution for this system.